APPENDIX B

PARTNERS IN INDOOR ENVIRONMENTAL PROTECTION

OTHER FEDERAL AGENCIES

WORKING TOGETHER

EPA has worked in conjunction with a number of federal agencies on joint efforts to protect human health indoors. A few examples of these activities are:

JOINT PUBLICATIONS:

With the Consumer Product Safety Commission (CPSC):

- The Inside Story
- Asbestos in the Home
- Combustion Appliances and Indoor Air Pollution
- What You Should Know About Using Paint Strippers
- Indoor Air Pollution: An Introduction for Health Professionals

With the Department of Health and Human Services (DHHS):

- Building Air Quality: A Guide for Building Owners and Managers
- A Citizen's Guide to Radon
- Introduction to Indoor Air Quality

With CPSC and the Department of Housing and Urban Development (HUD):

- Protect Your Family From Lead in Your Home

JOINT PROJECTS:

EPA is working with:

- HUD, CPSC, and DHHS on a number of projects related to lead-based paint hazards.
- The General Services Administration , under Executive Order 13101, to develop guidance on environmentally-preferable products for use in federal buildings.
- The Department of Energy to implement energy-efficiency and other improvements at EPA facilities to improve laboratory operations and to take relevant lessons to a broader audience (hospitals, computers, etc.).
- The Department of Agriculture to develop a list of bio-based products that may be preferable for use in the indoor environment.

A number of federal agencies and departments outside EPA have responsibilities for protecting human health indoors. The efforts of the Occupational Safety and Health Administration (OSHA) in the Department of Labor, the National Institute for Occupational Safety and Health (NIOSH) in the Department of Health and Human Services (DHHS), and the General Services Administration (GSA) focus on protecting the health of the workforce.

Other agencies and departments focus on reducing exposures and risks to the general population. The Consumer Product Safety Commission (CPSC) is responsible for protecting American families, especially children, from the unreasonable risk of injury (including illness) and death from about 15,000 consumer products. The Department of Housing and Urban Development (HUD) provides for safe and healthful housing through programs to reduce exposures to formaldehyde, lead, and other toxic materials in homes.

Several agencies and departments are involved in important research activities to ensure the protection of human health indoors. For example, the Centers for Disease Control and Prevention (CDC), the Agency for Toxic Substances and Disease Registry (ATSDR), and the National Institutes of Health (NIH) perform wide-ranging public health research on pollutants indoors (e.g., lead, radon, environmental tobacco smoke, combustion products, allergens, and *Legionnella*). The Department of Energy (DOE) evaluates the health effects of radon exposure. DOE and the National Institute of Standards and Technology (NIST) perform research on the relationship between air movement and contaminant levels in buildings and other related issues.

A number of other federal agencies and departments also have key roles in protecting human health indoors. Many of these agencies are members of the Interagency Committee on Indoor Air Quality. A list of *Current Federal Indoor Air Quality Activities* can be found in EPA publication EPA-402-K-99-001.

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)

Under the Occupational Safety and Health Act (OSHAct), OSHA develops and enforces occupational safety and health standards, including those related to exposures to toxic substances, and has proposed a comprehensive indoor air quality standard for workplaces.

Key activities at OSHA include:

- Protecting the health and safety of American workers by promulgating mandatory standards and by inspecting workplaces to ensure compliance with those standards.
- Regulating worker exposure to toxic substances and harmful physical agents, including asbestos, lead, and noise.
- Proceeding with a comprehensive indoor air quality standard that would mandate proper operation and maintenance of building systems, control of point sources of indoor pollution, control of fumes and dusts during renovation and remodeling activities, and proper training of maintenance staff.
- Assisting and providing guidance to federal and state compliance officials in evaluating indoor environmental quality in non-industrial workplaces (including the occurrence of Legionnaires' disease and occupational asthma).

CONSUMER PRODUCT SAFETY COMMISSION (CPSC)

The Commission enforces five federal statutes: the Consumer Product Safety Act, the Flammable Fabrics Act, the Poison Prevention Packaging Act, the Federal Hazardous Substances Act, and the Refrigerator Safety Act. CPSC's mission is to:

- Protect the public against unreasonable risks.
- Assist consumers in evaluating comparative safety.

- Develop uniform safety standards so as to minimize conflicting state and local regulations.
- Promote research and investigation into causes and prevention of product-related deaths, illnesses, and injuries.

CPSC uses a variety of approaches to identify product hazards, including an internationally-recognized hospital emergency room reporting system and a toll-free hotline. The Agency assesses these hazards using a risk-based approach grounded in the best scientific data. Once the hazards are assessed, CPSC uses a wide range of tools to correct them, including:

- Voluntary standards and guidelines
- Product recalls and corrective actions
- Mandatory rulemaking (e.g., performance standards, bans, and labeling)
- Consumer education

Because CPSC is a federal agency, its product safety work and uniform safety guidance and standards ensure businesses a level playing field for domestic and imported consumer products. CPSC evaluates and acts on health hazards associated with the use of products in the following areas: fire (e.g., cigarette lighters and upholstered furniture), mechanical (e.g., children's products, household/structural products, power tools and equipment, and sports and recreational products), electrical (e.g., lights), and chemical (e.g., fuel-burning appliances). Some specific CPSC activities relating to human health indoors include:

- Evaluating carbon monoxide (CO) detectors to protect against CO poisoning and submitting recommendations for changes to the Underwriters Laboratories standard for CO detectors.
- Developing voluntary standards to limit combustion pollutant emissions from kerosene heaters, unvented gas space heaters, and camping heaters.
- Working with the gas water heater industry to develop an effective voluntary standard to address the ignition of flammable vapors.

- Reducing consumer exposures to lead and protecting against childhood lead poisoning by investigating the release of lead from imported vinyl miniblinds and requesting the industry cease using lead as a stabilizer in these products.
- Conducting a study of leaded paint and developing a strategy for use by state agencies for identifying and controlling leaded paint.
- Assessing the potential toxicity of fire-retardant chemicals.
- Identifying the potential for emissions of bioaerosols from portable humidifiers and developing guidelines for cleaning and maintaining these humidifiers to reduce bioaerosol emissions.
- Investigating and analyzing monitoring data on biological pollutants in homes, as part of the Harvard Six-City Study.
- Assessing the impact of selected residential heating, ventilating, and air-conditioning systems and control technologies on indoor air quality.
- Evaluating carpet systems to determine if the chemicals they emit into the air might be responsible for the health complaints reported by consumers.
- Measuring and assessing the risk of indoor air pollutant emissions from wood-burning stoves.
- Promulgating several regulations requiring child-resistant packaging for medicines and household chemicals to reduce the number of deaths to children under the age of five from accidental ingestion.
- Assessing the potential for noise-induced hearing loss from consumer products.
- Developing and disseminating consumer information booklets on asbestos, formaldehyde, biological pollutants, lead, combustion pollutants, and carbon monoxide detectors.

Department of Energy (DOE)

Under the Energy Organization Act, the Atomic Energy Act, and the Energy Conservation and Production Act, DOE:

- Conducts research on the health effects of ionizing radiation, including radon.
- Establishes guidance for energy-efficient buildings and promotes their use.
- Evaluates the impact of energy conservation standards on habitability.

Key research at DOE includes:

- Developing, testing, and evaluating energy-efficient and cost-effective techniques to maintain indoor environmental quality.
- Developing methods and protocols for measuring emissions from key building materials and products.
- Determining the relationship between organic pollutants in large buildings and residences and energy-conservation methods.
- Developing methods to model and measure infiltration and interzonal airflows and assess ventilation of U.S. housing and associated energy use.
- Assessing the potential to improve productivity of office workers by providing better indoor environments (in conjunction with the National Institute for Occupational Safety and Health).
- Supporting the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) in developing effective ventilation and indoor air quality standards.
- Developing practical measurement techniques for ventilation rates and efficiencies.
- Minimizing or eliminating the adverse energy impacts of radon mitigation technologies.
- Developing an understanding of any cellular and molecular effects of radon.

DEPARTMENT OF HEALTH AND HUMAN SERVICES (DHHS)

Under the Public Health Services Act (PHSA), DHHS performs research and other activities on the cause, diagnosis, treatment, control, and prevention of disease related to indoor pollution. These activities include:

- Identifying pollutants and other environmental conditions responsible for human disease and adverse effects on humans.
- Evaluating the health costs of pollutants (with EPA and others).

There are a number of institutes and agencies within DHHS that are doing work to protect human health indoors. The National Institute for Occupational Safety and Health (NIOSH) within the Centers for Disease Control and Prevention (CDC) answers inquiries on indoor environmental quality in non-industrial workplaces (e.g., offices) and performs site investigations to solve environmental problems in these workplaces.

Other activities at CDC include:

- Providing information to state health departments and members of the public concerning the health effects of indoor environmental pollutants.
- Developing reliable tests for tobacco smoke exposure.
- Providing assistance to state and local health departments in conducting screening and surveillance activities in order to minimize the adverse effects of environmental lead contamination.
- Providing assistance to states to address asthma including a variety of training and program development efforts, transfer of best practices, and modes for surveillance.

The Agency for Toxic Substances and Disease Registry (ATSDR) within DHHS provides assistance and advice on indoor environmental contaminant exposures related to hazardous waste sites.

Several institutes within the National Institutes of Health (NIH) are also doing work to protect human health indoors, especially in the area of asthma.

Department of Housing and Urban Development (HUD)

HUD has been actively involved in a number of key indoor environmental issues. Through the National Manufactured Housing Construction and Safety Standards Act, HUD has provided for safe and healthful conditions in manufactured housing. Standards for formaldehyde emissions from pressed wood products have been promulgated under this Act. In addition, HUD is working to improve the air distribution systems in these types of homes.

Through the Residential Lead-Based Paint Hazard Reduction Act, HUD works to reduce lead exposures in U.S. housing. Key activities in this area have included:

- Demonstrating lead hazard abatement strategies and preparing a workable plan for abatement in public housing.
- Surveying public awareness of lead-based paint hazards to determine the impact on hazard disclosure on real estate transactions.
- Evaluating the effectiveness and cost of the methods used by HUD grantees to reduce hazards in privately-owned housing occupied by low-income households.
- Studying the effectiveness of educating families on special lead-dust cleaning practices.
- Developing model provisions for state and local housing codes that incorporate best hazard control practices.
- Research on lead paint identification, evaluation, and control methods.

HUD also determines HUD/FHA and Public and Indian housing policies on radon issues.

Finally, conducting general or targeted community awareness of education programs on environmental health and safety hazards under their "Healthy Homes" Initiative, HUD considers allergens and asthma, asbestos, combus-

tion products, insect and rodent pests, mold and moisture, pesticide residues, and radon key targets for intervention.

GENERAL SERVICES ADMINISTRATION (GSA)

GSA provides indoor environmental quality guidelines for federal (GSA-owned) buildings and leased space. Key activities include:

- Providing information to consumers who purchase office furniture from the Federal Supply Service schedule.
- Coordinating radon testing and mitigation in GSA-controlled buildings.
- Funding indoor air quality research by the National Institute for Occupational Safety and Health in GSA buildings.
- Providing an indoor environmental quality program that has:
  - An ongoing component that includes responding promptly to concerns and, when possible, correcting problems discovered.
  - A pro-active component that includes conducting indoor environmental assessments as part of a survey program.

GSA also coordinates the development, printing, and distribution of indoor environmental publications for federal agencies and provides several publications on indoor environmental quality through the Consumer Information Catalog.

National Institute of Standards and Technology (NIST)

The focus of studies at NIST has been on the relationship between ventilation and contaminant levels in buildings. Activities at NIST include:

- Developing models to account for air movement and contaminant dispersal in buildings.
- Developing an understanding of factors affecting the mixing of carbon monoxide in buildings as it relates to the location of detectors.
- Performing simulation studies of approaches to the ventilation of residential buildings.
- Developing test methods and procedures for studying air change characteristics, pollutant levels, and their relationship in large buildings.
- Developing a practical guide to procedures for assessing ventilation rates in commercial buildings.
- Developing test methods for lead in paint (in cooperation with HUD and EPA).
- Maintaining national radium and radon measurement standards.

STATE, LOCAL, AND TRIBAL AGENCIES

The quality and structure of state, local, and tribal indoor environmental programs vary significantly from state to state. Some states have strong or moderately strong indoor environmental programs, while others have essentially no programs at all.

State, local, and tribal programs provide public information, problem assessment, and response, but often these activities are divided among several agencies, particularly at the state level, as a reflection of the multifaceted nature of indoor environmental issues. Some states, like California, Florida, and Vermont, have interagency indoor environmental groups to coordinate activities across state agencies. The strongest state programs are those which have been mandated by state legislation. In these states, much of what has been achieved has been through voluntary compliance. Many state and local governments do have some regulatory authority in specific areas (e.g., asbestos, lead, radon, and environmental tobacco smoke). A substantial component of many state programs is to assist local governments and tribes to address indoor environmental issues at the local and tribal level.

State-level indoor environmental programs are often hampered by the lack of a routine funding mechanism, with the exception of state radon programs which can receive federal funding. Agencies sometimes respond to problems identified through publicity or public outcry. Such response is frequently reactive and crisis-driven. In some states, there is no organized structure in place to educate or empower the public about their indoor environment, and funding may decrease when the issue drops out of the media spotlight.

Like state government, local health and/or environmental offices often have no established indoor environmental programs. They may create a mechanism to respond to a current crisis, routine public inquiries, or public outcry.

The scarcity of local government programs is being offset by grassroots coalitions and non-profit organizations, extension educators, and local professional organizations working independently and in cooperation with each other and federal, state, and local officials on public outreach and program implementation. Some funding and training for indoor environmental

activities is available for and utilized by local governments, local health and environment officials, and non-profit organizations. More limited funding may be available for local indoor environmental needs on a competitive or ad hoc basis from federal and/or state agencies.

Some tribal governments have established radon and indoor environmental programs receiving federal funding. The close-knit nature of tribal councils and the high regard of elders has proven effective in implementing grassroots environmental programs and allowed for good coordination of environmental program activities. Economic and cultural issues make some environmental issues a particular challenge. Involvement of the tribal council and elders assures awareness of cultural sensitivities and increases the opportunity for success.

The strongest indoor environmental programs were found in states where there was a funding mechanism, upper management support of the program, and/or full time staff dedicated to indoor environmental efforts. However, even states with strong programs generally face constraints which prevent them from doing the kind of proactive outreach which would prevent indoor environmental problems and crises or have serious gaps in their programs. For example, some statewide/regional programs cover such a large geographic area that individual city or county assistance could be more effective. Some states have a strong indoor environmental quality program in schools, but do not address homes at all. In other states, efforts for lead or pesticides may be targeted to specific audiences due to staff limitations (e.g., integrated pest management in schools, lead awareness to real estate professionals). Pesticides programs are frequently housed in state agriculture departments, which will follow up on indoor environmental concerns regarding pesticides misuse if contacted.

OTHER STAKEHOLDERS

Many different entities in the private sector impact the state of human health indoors. A few of the key stakeholder groups that have a role in protecting human health indoors, and their potential roles in solving indoor environmental problems, are discussed below.

CONSUMER, ENVIRONMENTAL, AND HEALTH PROFESSIONALS

Consumer, environmental, health, and other professionals are knowledgeable of the symptoms and effects produced by environmental pollutants and can advise the public on possible mitigation of environmental exposures. They use diverse approaches to protecting human health indoors, including developing information and education programs to educate the public about indoor environmental quality, conducting research to identify problems and recommend solutions, and participating in the policy-making process.

MANUFACTURING AND NATURAL RESOURCE INDUSTRIES

Manufacturers can ensure good indoor environments by designing products and materials that eliminate or reduce exposures to toxic chemicals, pesticides, and other pollutants to safe levels. These include consumer and commercial products, building materials, office equipment, and furniture. Manufacturers can also label their products so that they will be properly used and maintained. If a supplier provides raw materials (e.g. chemicals) to be formulated further into a product, the supplier can provide the formulator with sufficient health and safety information to allow the formulator to determine if the raw material can be safely used in the intended application. Manufacturers and suppliers can conduct research and adopt test procedures (e.g. emission test procedures) and standards to ensure that the products and materials that they sell are safe for use in indoor environments.

Builders and Architects

Builders and architects can work to design and build structures that eliminate indoor environmental problems or enhance indoor environments. By thinking about the quality of the indoor environment in the design stage, in construction practices, and in remodeling, builders and architects can have a substantial impact on the health and safety of the building occupants. Builders and architects can help achieve safe indoor environments by selecting building materials that will not release harmful levels of toxic chemicals into occupied indoor environments (either when the materials are new or as they age) and by designing buildings to be in compliance with indoor air quality ventilation standards. During the remodeling of occupied buildings, builders and architects can help protect the safety of tenants by isolating them from pollutants generated during construction work.

Building Owners, Managers, and Engineers

Building owners, managers, and engineers ensure good indoor environmental quality by properly operating and maintaining buildings. Building owners, managers, and engineers can foster a good indoor environment by adopting ventilation maintenance procedures to eliminate and prevent contamination and ensure an adequate supply of clean air to occupants; using zone ventilation or local exhaust for indoor sources; developing specific procedures for use of cleaning solvents, paints, pesticides, and other products and materials within the building; and abiding by recognized standards of care for building maintenance. Their role includes establishing a process to educate building occupants about their roles in maintaining good indoor environmental quality and encouraging an active exchange of information about indoor environmental problems. They can develop and adopt formal protocols to investigate indoor environmental complaints from occupants, thereby encouraging an atmosphere of trust.

DIAGNOSTIC AND MITIGATION SERVICES

Diagnostic and mitigation firms respond to hazards and complaints in problem buildings. They may work closely with building owners, managers, and engineers or individual homeowners to investigate indoor environmental quality issues. Professionals in these firms span a broad range of occupations, including industrial hygienists, mechanical (ventilation) engineers and technicians, microbiologists, architects, chemists, air pollution scientists, industrial engineers, risk assessment personnel, abatement personnel, and others. The services of most of these firms include evaluations of ventilation systems, measurement of indoor pollutants, and characterization of the sources of pollutants in buildings. Through these efforts, they can be instrumental in turning a problem building into a healthy building.

REAL ESTATE INDUSTRY

The real estate industry has begun addressing a variety of indoor environmental issues in the past few years as a result of both client demand and legal requirements. The real estate industry, discovering a need to know more about radon, lead, asbestos, the safe application of pesticides, and underground storage tanks, is partnering with government and industry organizations to provide the necessary training to its members to facilitate transactions and improve customer service.

UNIONS

Unions can protect human health indoors by ensuring a clean and healthy indoor environment for their members. They can work with building owners, managers, and engineers to ensure that employees are afforded an optimum work environment. If problems occur, they can come to the aid of employees who feel that they have been improperly exposed to pollutants in their workplaces and can work with building designers, owners, managers, and engineers in the design and operation of healthy workplaces.

Standard-Setting Organizations

Standard-setting organizations (e.g., building code organizations, the American Society for Testing and Materials (ASTM), the American National Standards Institute (ANSI), the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), Underwriters Laboratory (UL), NSF International, and the American Conference of Governmental Industrial Hygienists (ACGIH)) can play an important role in protecting human health in indoor environments. Depending on the organization, they can provide a range of services. One important service of some standard-setting organizations is to foster healthy indoor environments by developing or enhancing, providing for efficient use of, and, and in some cases, enforcing model building codes. Other services standard-setting organizations may provide are setting uniform methods of testing, establishing levels of accepted practice, or developing and maintaining consensus standards. Some may provide certification opportunities, laboratory testing and toxicological assessments related to certification, and conformity assessments and compliance monitoring. Education and training services may also be provided. Standard-setting organizations can help product manufacturers, code writers, designers, builders, enforcement officials, and others perform their functions in a more effective and efficient manner. Standard-setting organizations can also play an important role providing the public with some assurance that their homes, schools, and workplaces, and the products that go into them, are safe.

Research Organizations

Many research organizations work to protect human health indoors. Some of these organizations address policy issues, such as providing critical analyses of the potential risks for pollutants indoors, addressing land use and building design issues, or setting future strategies for protecting indoor environments. Scientific research organizations address a wide range of issues related to indoor environments, including proper building design and operation, health and comfort impacts of poor indoor environments, measurements of indoor pollutants and the characterization of emissions

from products and materials used indoors, and exposure mitigation (e.g., ventilation, air cleaning, source control, and individual behaviors). Because research in indoor environments is relatively new, these organizations play a key role in determining future areas of concern for indoor environments.

INDIVIDUALS

Individuals are the strongest force in protecting human health indoors. Consumers protect their own health and the health of those around them by properly maintaining their homes and making informed choices about consumer goods and services. Building occupants (e.g., office workers) do the same by properly using products and equipment within the building. With knowledge, individuals can take many actions to avoid personal exposures. The value of individual behavior cannot be minimized in our efforts to develop and implement a nationwide strategy to improve indoor environments.